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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912.262	07/24/2001	Roger L. Schultz	2000-IP-000069	4140

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EXAMINER

WAKS, JOSEPH

ART UNIT PAPER NUMBER

2834

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/912,262	SCHULTZ ET AL.	
	Examiner	Art Unit	
	Joseph Waks	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14, 15, 18-49, 57-73, 76-79, 82-87, 95-97, 104-108 and 116-123 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-7, 9-11, 75, 80, 89- 93, 98, 99, 101, 109, 110, 112 and 113 is/are rejected.
- 7) ☐ Claim(s) 4, 111, 100, 102, 103 and 115 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0603, 0701
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Continuation of Disposition of Claims: Claims pending in the application are 1-7,9-11,14,15,18-49,57-61,63-73,75-80,82-87,89-93,95-113 and 115-123.

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of **claims 3 and 5** are withdrawn in view of the new interpretation of reference(s) to **Russel et al. (US 3,970,877)**. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 2, 7, and 75** are rejected under 35 U.S.C. 102(b) as being anticipated by **Kolm et al. (US 4,387,318)**.

Kolm et al. disclose in Figure 5 invention as claimed: an electric power generator comprising a fluid conduit (the air passages in the fence 50) configured for flow of fluid there through having an internal surface with outwardly extending projections 14 inducing turbulent flow in the conduit, and a piezoelectric material 34 attached to the external surface of the conduit and producing electricity in response to pressure fluctuations in the conduit caused by the fluid flow.

4. **Claims 1-3, 5, 6, 10, 75, 80, 89-93, 98, 99, and 101** are rejected under 35 U.S.C. 102(b) as being anticipated by **Russel et al. (US 3,970,877)**.

Re claims 1, 2, 3, 5, **Russel et al.** disclose invention as claimed: an electric power generator comprising a fluid conduit (the mud passage shown by up arrows) configured for flow

of fluid there through having an internal surface with inwardly extending projections 11 inducing turbulent flow in the conduit, and a piezoelectric material 10 attached to the conduit and producing electricity in response to pressure fluctuations in the conduit caused by the fluid flow.

Re claim 6, **Russel et al.** disclose invention as claimed: an electric power generator comprising a fluid conduit configured for flow of fluid there-through, a piezoelectric material 10 attached to the conduit and producing electricity in response to pressure fluctuations in the conduit, the fluid conduit including a reduced thickness portion thereof, the piezoelectric material being attached proximate the reduced thickness portion, the reduced thickness portion having an increased degree of flexing in response to the pressure fluctuations in the conduit.

Re claim 10, **Russel et al.** disclose invention as claimed: an electric power generator comprising a fluid conduit configured for flow of fluid there-through as shown in the drawing by arrows pointing up, a piezoelectric material 10 attached to the conduit and producing electricity in response to pressure fluctuations in the conduit, and the conduit having an internally formed by formation 11 recess inducing turbulence in the fluid flow.

Russel et al. disclose invention as claimed: an electric power generator comprising a tubular fluid conduit connectable in a tubular string and a piezoelectric material 10 producing electricity in response to pressure fluctuations in the conduit caused by the fluid flow and attached to the external surface of the fluid conduit.

The feature of the reduced thickness portion is inherent to the Russel et al's disclosed structure.

5. **Claims 109, 110, 112, and 113** are rejected under 35 U.S.C. 102(b) as being anticipated by **Kunkel (US 5,554,922)**.

Kunkel discloses in Figure 1 invention as claimed: a fluid conduit configured to flow the fluid there through (Re column 4, lines 3-5), a fluid chamber 4 vibrating in response to pressure fluctuations in the conduit, a piezoelectric material 6 attached to the chamber and producing electricity in response to the fluid chamber vibration.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 9 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Russel et al. (US 3,970,877)** in view of **Klatt (US 4,669,068)**.

Russel et al. disclose the generator essentially as claimed. However, **Russel et al.** do not disclose the fluid conduit being helically shaped.

Klatt discloses in Figures 1 and 2 an electric power generator provided with a drill string and having a helically shaped fluid conduit 2 for the purpose of improving the generator adapted for low frequencies by absorbing the extra length required for the piezoelectric converter 10.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the generator as taught by **Russel et al.** or **Tubel et al.** and to provide the helically shaped fluid conduit as taught by **Klatt** for the purpose of improving the generator that is adapted for low frequencies by absorbing the extra length required for the piezoelectric converter using the helical configuration.

Allowable Subject Matter

8. **Claims 14, 15, 18-49, 57-61, 63-73, 76-79, 82-87, 95-97, 104-108 and 116-123** are allowable.

Re claims 14, 15, 18-22, 82-87, 95-97 104-108 and 116-123, the feature of the generally tubular fluid conduit connectable in a tubular string positioned in the subterranean well, in combination with the other limitations present are neither disclosed nor taught by the prior art of record.

Re claims 23-36, the feature of the structure including a mass reciprocally disposed relatively to the housing and the bias member positioned between the mass and the piezoelectric material

Re claims 37-49, the method of producing power including steps of interconnecting the outer housing in the tubular string, positioning the tubular string in the subterranean well and flowing fluid though the housing thus, inducing the strain in the piezoelectric material via the bias member positioned between the mass and the piezoelectric, in combination with the other limitations present, are either disclosed or taught by the prior art of record.

Re claims 57-61, and 63-73, the electrical power generator for use in conjunction with a subterranean well having a fluid conduit, a fluid chamber in fluid communication with the fluid conduit wherein the chamber vibrates in response to pressure fluctuations in the conduit; and a piezoelectric material attached to the fluid chamber and producing electricity in response to the fluid chamber vibration, in combination with the other limitations present, are either disclosed or taught by the prior art of record.

Re claims 76-79, 83-85, 102, 107 and 108, the feature of the piezoelectric material supporting the member extending into the flow passage, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

9. **Claims 4, 100, 102, 103, 111 and 115** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Re claim 4, the feature of the generally tubular fluid conduit connectable in a tubular string positioned in the subterranean well, in combination with the other limitations present are neither disclosed nor taught by the prior art of record.

Re claims 100 and 102, the feature of the piezoelectric material supporting the member extending into the flow passage or the retainer, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 103, 106 the feature of the member contacting the retainer in response to fluid flow and the piezoelectric material producing electricity in response, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 111 and 117, the feature of the tubular membrane, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 115 the feature of the piezoelectric material outwardly surrounding the membrane, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Response to Arguments

10. Applicant's arguments filed on May 8, 2003 have been fully considered but they are not persuasive.

Re claims 1, 2, 7, and 75. The Office action of February 11, 2003 was citing Kolm et al. US 4,387,318 as a base for rejection. The cited in Office action Kolm et al. (US 4,467,236) reference was a typographic error. Please refer in your response to Kolm et al. US 4,387,318 as corrected above.

Re claim 6, **Russel et al.** clearly pictures a well known down-hole system having fluid injected into the hole (down arrows) being in direct contact with the mud discharged toward the surface (up arrows). Therefore, pressure fluctuations induced by the ribs 11 inherently will cause pressure fluctuations in both the supply flow and the discharge flow. Moreover, in this particular arrangement the passage between the tubular form and the down-hole also satisfies the definition of the fluid conduit or passage (Re 1984 issue of Webster's II New Riverside University that defines passage or channel as a course through which something may be moved or directed).

Re claims 9 and 11. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Russel et al. disclose in column 1, lines 32-35 utilizing the turbulent fluid flow in the conduit for power generation. **Klatt** discloses electric power generator provided with a drill string and having a helically shaped fluid conduit for the purpose of improving the generator

adapted for low frequencies by absorbing the extra length required for the piezoelectric converter. In combination **Russel et al.** and **Klatt** disclose invention as claimed

Re claims 80, 89-91, 98, 99, 101, 104 and 105. In the conduit that transfers the mud toward the surface (up arrows) the protrusion 11 extends inwardly into the conduit flow passage, member 10 is a flexible member vibrates (i.e. displaces) in response to the fluid flow and is retained in the conduit.

Re claim 109. The cavity 5 outwardly surrounds the membrane 3 in the axial direction.

11. Applicant's arguments with respect to claims 10 and 75 have been considered but are moot in view of the new ground(s) of rejection.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Waks whose telephone number is (703) 308-1676. The examiner can normally be reached on Monday through Thursday 8 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor R Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-1341 for regular communications and (703) 305-1341 for After Final communications.

Application/Control Number: 09/912,262

Page 9

Art Unit: 2834

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.


JOSEPH WAKS
PRIMARY PATENT EXAMINER
TC-2800

JW
June 20, 2003